

PCT

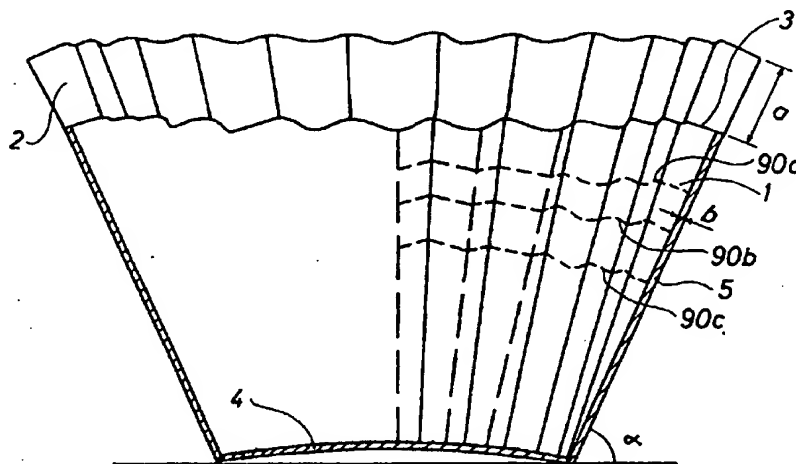
WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup>:</b> A21B 5/02, A21C 15/02, B65D 65/64, 85/78	<b>A1</b>	<b>(11) International Publication Number:</b> WO 95/08268 <b>(43) International Publication Date:</b> 30 March 1995 (30.03.95)
<b>(21) International Application Number:</b> PCT/DK94/00352 <b>(22) International Filing Date:</b> 21 September 1994 (21.09.94) <b>(30) Priority Data:</b> 1057/93 21 September 1993 (21.09.93) DK <b>(71)(72) Applicant and Inventor:</b> KLØFT, Henrik [DK/DK]; Søvej 34, DK-4140 Borup (DK). <b>(74) Agent:</b> CHAS. HUDE; H.C. Andersens Boulevard 33, DK- 1553 Copenhagen V (DK).		<b>(81) Designated States:</b> AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** A PACKAGING, IN PARTICULAR FOR ICE CREAM, AND A METHOD AND APPARATUS FOR THE MANUFACTURE THEREOF



**(57) Abstract**

A packaging, in particular for ice cream, comprising a cup-formed waffle (1) made from an essentially plane waffle (47) baked of a substantially sugar-containing paste by moulding said plane waffle in warm workable state. The waffle (1) is formed in one piece of essentially the same thickness of material (b) and has a bottom (4) with an essentially convex bottom outline and a circumferential wall (5) folded up from the bottom without essentially causing strain thereof, said wall having at least one corrugated wall portion provided with corrugations extending from the bottom outline, the corrugation height thereof increasing in outward direction from the bottom. The application also refers to a method and an apparatus for the manufacture of the packaging.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

A PACKAGING, IN PARTICULAR FOR ICE CREAM, AND A METHOD AND  
APPARATUS FOR THE MANUFACTURE THEREOF

Technical Field

The invention relates a packaging, in particular for icecream, comprising a cup-  
5 formed waffle made from an essentially plane waffle baked of a substantially sugar-  
containing paste by moulding said paste in warm, workable state.

Background Art

Usually, waffles serving as packaging for icecream are cone-shaped and called  
waffle cones. Waffle cones may either be prepared as moulded cones by filling  
10 liquid waffle paste in a mould, said paste then being baked to finished cones and  
removed from the mould. Moulded cones usually have a very low sugar content,  
typically less than 5% in order to make it possible to remove the baked cones from  
the mould without damaging it. However, moulded waffle cones with a higher sugar  
content exist, very high demands are made to the design and surface treatment of  
15 the mould and the composition of the paste to avoid that the paste sticks to the  
mould during baking.

Waffles with a high sugar content, i.e. a sugar content in the order of 30 to 35%  
or more, are usually made as rolled cone waffles, i.e. they are made in a warm and  
workable state by rolling up a plane, baked plane waffle to the desired cone shape.  
20 Rolled waffle cones having a high content of sugar (so-called sugar cones) are  
encumbered with several drawbacks. It is difficult to make them with sufficient  
accuracy, for which reason they often have different opening diameters and different  
height and thereby also different stacking measurements and volume for icecream  
and the like to be placed in the interior of the waffle. This is particularly a draw-  
25 back at industrial manufacture of icecream-filled waffles, as the said inaccuracy may  
cause problems at the handling of the waffles. Furthermore, as the waffles have  
been rolled up, they have a hole in the bottom, through which icecream may flow,

as it melts. This drawback may sometimes be remedied by placing chocolate at the bottom of the cone and thus sealing the hole.

EP 0 221 356 discloses a method and an apparatus for the preparation of cup-shaped, rolled waffles, whereby initially an essentially plane waffle is baked, which  
5 subsequently in a workable state is rolled up on a roll-up body arranged in a die. During the rolling-up process a punch forms a convex bottom on the waffle. The wall and bottom of the cup both have overlapping wall portions with increase wall thickness.

Moreover, DE 25 08 533 discloses a method and an apparatus for the preparation  
10 of the bowl-shaped sugar-containing waffle. A plane, baked waffle is placed between a die and a punch. The punch is subsequently introduced into the die and the plane waffle is drawn and pressed into the shape of a bowl. This is a draw and press process comparable to a deep drawing process. In such a process, the portion of the plane waffle forming the wall of the cup is subjected to a circumferential strain  
15 increasing with radius, the annular portions of the plane waffle forming the annular portions of the wall of a smaller radius. Simultaneous with said circumferential strain, the material is subjected to an radial strain increasing with radius. Further, the weakest portion of the cup, i.e. the transition area between the portion and the side wall has to be able to withstand the pressing force necessary to obtain said  
20 deformations of the material (the paste) without this breaking, whereby a limit is set for the height of the drawn cups. In practice, it has only been possible to draw waffle cups of minor wall height.

Finally, US 5,002,783 discloses an edible cup with uniform wall thickness comprising a circular bottom and a corrugated sidewall with corrugation axis radiating from  
25 the circular bottom. In column 3, lines 34 to 39 it is stated that the cup is made of a material which can be formed and baked or heated so that it is bound together in the desired cup shape. It is thus implied that the material is formed prior to baking contrary to the present invention, wherein the plane waffle is formed in a baked, workable state. Furthermore, it appears from the drawing that the corrugations are

of a substantial height in the portion at the bottom and moreover, of essentially the same height in the portion at the bottom as in the portion at the outer periphery of the sidewall, which indicates that it is not a wall folded up from the bottom as in the present invention.

## 5 Disclosure of the Invention

The object of the invention is to provide a packaging of the type stated in the introduction remedying the drawbacks of the known cup-shaped waffles and in particular enabling a rational manufacture of high-walled waffles having a high sugar content.

- 10 The packaging according to the invention is characterised in that the waffle is formed in one piece of essentially the same thickness of material and having a bottom with an essentially convex bottom outline, a circumferential wall folded up from the bottom without essentially causing any strain thereof and having at least one corrugated wall portion provided with corrugations extending from the bottom  
15 outline, the corrugation height thereof increasing in outward direction from the bottom.

- Such a packaging or waffle may be formed by folding a plane waffle plank upwardly and is thus not provided with any openings, through which melting ice can flow and it may be made of a paste with a arbitrary high content of sugar. Moreover, the  
20 corrugated portions provide the waffle with a degree of flexibility, for which reason it can withstand larger elastic deformations than known rolled or moulded waffles, whereby advantages in relation to handling are obtained, in particular at industrial manufacture of icecream waffles, the waffle per se being less sensitive to mechanical stress.

- 25 According to the invention, the pitch of the corrugation may be no more than 20%, preferably no more than 10% and most preferably no more than 5% of the length of the outline in the corrugated portion. In practice, a relatively large number of

corrugations, that is more than eight corrugations and preferably in the order of 20 to 24 corrugations, has proven advantageous in the manufacture of waffles provided with a circular bottom outline.

Furthermore, according to the invention, the plane waffle may be baked of a paste  
5 having a sugar content in excess of 15 percentage by weight, preferably in excess of 25 percentage by weight and most preferably in excess of 35 percentage by weight.

Moreover, according to the invention, the packaging may comprise a film wrapping arranged on the outer face of the waffle, said wrapping essentially circumscribing  
10 the waffle tightly and preferably extending beyond the upper edge thereof.

This embodiment of the invention is particularly advantageous for industrially manufactured icecream waffles, as it has been found that the packaging comprising the waffle per se and the film wrapping may be produced in a single operation. At the same time, the film wrapping acts as protection for the waffle during filling and  
15 the subsequent processing and end packaging thereof.

Further, the invention relates to a method for the preparation of a packaging comprising a cup-shaped integrally formed waffle made of a baked plane waffle of paste by moulding this in a warm workable state, said waffle comprising a bottom having an essentially convex bottom outline and a circumferential wall folded up  
20 therefrom having at least one corrugated portion provided with corrugations extending from the bottom outlined.

The method according to the invention is characterised by the following steps:

- a. placing the warm, workable plane waffle between two mould halves arranged axially displaceable in relation to each other, an inner and an outer half, respectively, of which at least one and preferably both are provided with a bottom-forming  
25 central part and both having a pivotal wall-forming, circumferential part having at

least one section containing corrugation-forming faces, and being pivotal between an initial position, wherein the wall-forming faces are in a common plane and a forming end position corresponding to the desired form and corrugation of the packaging;

- 5 b. pressing the mould halves together about the plane waffle and folding the wall portion up and at the same time folding the section(s) thereof up to be corrugated, while holding the plane waffle tight and without essentially causing any strain of the wall portion, by means of a controlled simultaneous turning of the pivotal wall-forming portions of the mould halves in order to provide the desired waffle  
10 shape,

c. cooling the moulded waffle until the shape thereof is stable,

d. displace the two mould halves axially from each other,

e. remove the complete waffle, and

f. move the mould halves back to their initial position and initial shape.

- 15 As the plane waffle is controlled and held tight during the entire moulding process by the wall-forming parts of the mould halves, a controlled folding of the walls at the desired positions is obtained without any the risk of a uncontrolled folding, whereby a very high degree of accuracy and reproducibility of the folded waffle are obtained. The method is particularly advantageous in that it enables production of  
20 waffles having in principle an arbitrarily high content of sugar.

According to the invention, with regard to producing a packaging which in addition to the waffle per se comprising a wrapping arranged on the outer face thereof, and subsequent to step a, a sheet of a flexible packing material may be arranged adjacent the outer mould half and between the two mould halves, whereafter the other steps  
25 are carried out for the plane waffle and the packing sheet jointly.

- This embodiment of the invention is particularly advantageous in that the packaging comprising the waffle per se and the wrapping may be produced in a single work operation. This in contrast to the known methods, in which the waffle is initially made and wrapping is subsequently arranged about this, which besides being more
- 5 time-consuming also involves a certain risk of the waffle being damaged during arrangement of the sheet of wrapping. This is avoided by the method according to the invention, which additionally has the advantage that if the waffle is damaged or breaks, the crumbs remain in the wrapping and are thus not fed into the production equipment, where they could cause harm or obstructions. The embodiment is
- 10 particularly advantageous in case the sheet of wrapping extends beyond the periphery of the plane waffle, the packaging of the icecream then being provided by merely arranging a cover sealingly at the upper edge of the sheet of packing, whereby the icecream and the waffle are circumscribed in a sealing manner by said cover and the sheet of packing.
- 15 Moreover, the invention relates to an apparatus for the manufacture of a packaging comprising a cup-shaped waffle made of a baked plane waffle of paste by moulding this in a warm workable state into a continuously coherent cup with essentially uniform thickness of material, comprising an essentially plane bottom with an essentially convex bottom outline and a circumferential wall folded up therefrom
- 20 having at least one corrugated wall section provided with corrugations extending from the bottom outline.

The apparatus according to the invention is characterised in that it comprises:

- two mould halves axially displaceable to and fro each other in a frame, an inner and an outer mould half, respectively, of which at least one and preferably
- 25 both are provided with a bottom-forming central part and both have a wall-forming, circumferential part being pivotally arranged in relation thereto and having at least one section containing corrugation-forming faces, and being arranged so as to pivot between an initial position, wherein the wall-forming faces are in a common plane and an end-forming position, wherein they extend in an inclined outwardly manner



in direction away from the bottom-forming part to provide the wall and the intended corrugations therein, and

- means for a controlled simultaneous turning of the pivotal wall-forming part of the mould halves in relation to the at least one bottom-forming part in such a manner that the wall of a workable plane waffle placed between the mould halves is held tight during the folding thereof so as to not essentially cause any strain thereof.

Furthermore, according to the invention, the inner and outer corrugation-forming faces may be formed of a plurality of interspaced and rod-like mould parts being pivotal in relation to their bottom-forming part, said mould parts extending radially or radiating outwardly in relation to their bottom-forming part, the rod-like mould parts of the outer wall-forming part being arranged in the interspace between the rod-like mould parts of the inner wall-forming part and vice verse.

Finally, according to the invention the rod-like parts may be connected to a common mould part element by means of connecting rods, said mould part element being axially displaceably arranged in relation to the bottom-forming part of the mould half in question.

#### Brief Description of the Drawings

The invention is described in greater detail in the following with reference to the accompanying drawings, in which

Fig. 1 is a top view of a packaging according to the invention comprising a cup-shaped waffle and an outer wrapping,

Fig. 2 is a sectional view along the line I-I in Fig. 1,

Fig. 3 is a diagrammatic, side elevational view of an apparatus according to the

invention for carrying out the method according to the invention for the preparation of the a packaging according to the invention,

Fig. 4 is a diagrammatic, sectional view along the line IV-IV in Fig. 3,

Fig. 5 illustrates two mould halves of the apparatus shown in Fig. 4 in the initial position for moulding the packaging according to the invention;

Fig. 6 illustrates two mould halves in an intermediate position during moulding of the packaging,

Fig. 7 illustrates the mould halves in an end position for moulding the packaging according to the invention.

#### 10 Best Mode for Carrying Out the Invention

The packaging shown in Figs. 1 and 2 comprise a cup-shaped waffle 1 and a wrapping 2 of a flexible packing material arranged on the outer face of the waffle and essentially circumscribing this in a tight manner. Moreover, the flexible wrapping 2 extends a length  $a$  beyond the upper edge of the waffle 1. The waffle 1 is made of a plane waffle (not shown) baked particularly of a sugar-containing paste, preferably a paste having a high content of sugar, that is a sugar content in excess of 30%, by moulding the plane waffle in a warm workable state. The waffle is integrally formed and has essentially uniform wall thickness  $b$ . The waffle 1 comprises a bottom 4 having a circular outline and being slightly dome-shaped. Furthermore, the waffle is provided with a side wall 5 inclined upwards and outwards from the outline of the bottom 4. The wall 5 is corrugated with corrugations or folds extending from the outline of the bottom 4 towards the edge of the cup. In the embodiment shown, wherein the cup is provided with a straight generatrix forming an angle  $\alpha$  with the plane of the bottom outline, the height of the corrugations increases constantly from the portion at the bottom 4 to the edge 3 of the sidewall 5.

The pitch of the corrugation makes up approximately 4% of the length of the outline, i.e. the pitch circle in the corrugated portion, the cup-shaped waffle 1 in the shown embodiment having 24 corrugations. The waffle shown is not correctly drawn, but in practice, based on a plane waffle of a diameter of 175 mm, a cup-shaped waffle is formed typically having a bottom outline of a diameter of 35 mm and an upper opening being approximately 70 mm internally, i.e. at the bottom of the corrugations and externally, i.e. at the top of the corrugations being approximately 90 mm and a height of approximately 65 mm. However, it is implicit that the waffle may have a plurality of other shapes, including being essentially cone-shaped with a bottom of a very small dimension.

Finally, the waffle is provided with a plurality of circumferential, linear portions 90a, 90b, 90c of reduced wall thickness (shown as dotted lines in Fig. 2). These weakening lines which may have different courses on the wall, i.e. extend parallel to the bottom outline or have a corrugated course or extend spirally and they ensure that the waffle does not break uncontrollably, when a persons takes a bite thereof.

The apparatus according to the invention shown in Figs. 3 to 7 comprises a frame 10 having two lateral uprights 11, 12, a bottom 13 and a head 14. The uprights 11, 12, the bottom 13 and the head 14 are U-shaped in cross-section and made of bent metal sheet.

Two guide bars 15, 16 extend between the head 14 and bottom 13, an upper slide member 18 and a lower slide member 19 being arranged displaceably thereon by means of guide bushes 17. Both the upper slide member and the lower slide member have a U-shaped cross-section and are made of bent metal sheet.

An upper shaft 20 extends between the lateral uprights 11,12 of the frame, said shaft being pivotally arranged in bearings 21,22 in the lateral uprights 11,12. Further, a lower shaft 23 is pivotally arranged in bearings 24,25 in the lateral uprights 11,12. The upright 11 shown on the left hand side in Fig. 3 further carries an upper step motor 26 and a lower step motor 27 intended to rotate the upper shaft 22 and the

lower shaft 23, respectively. The upper step motor 26 connected to the upper shaft 20 via a pulley 28 attached to its output shaft 29, a pulley 30 attached to the upper shaft 20 and a toothed belt 31 circumscribing said two pulleys. In a corresponding manner, the lower step motor 27 connected to the shaft 23 by means of a pulley 32  
5 attached to the output shaft 33, a pulley 34 attached to the lower shaft 23 and a toothed belt 35 circumscribing said two pulleys.

The upper step motor 26 acts to displace the upper slide member 18 and is connected thereto via a toothed belt transmission arranged at each end of the slide member. Each belt transmission comprises an upper pulley 37 fixedly connected to  
10 the upper shaft 20 and a lower pulley 38 pivotally connected to the lower shaft 23, and a toothed belt circumscribing said two pulleys 37 and 38 and being fixedly connected to the upper slide member 18. In addition to enabling a displacement of the slide member, the belt transmission at each end thereof act to prevent the slide member from tilting during displacement. In order to facilitate understanding of the  
15 drawing, the fixed connections between the belts and the shafts and the fixed connections between the slide members and the pulley are shown by means of a X, while the pivotal bearings between the shafts and the pulleys are shown by means of an O.

For displacement of the lower slide member 19, the lower step motor 27 is connected therewith by means of a belt transmission arranged at each end of the slide member 19. Each belt transmission comprises a lower pulley 40 fixedly connected to the lower shaft 23, and an upper pulley 41 pivotally connected to the upper shaft 20, and a toothed belt 42 circumscribing the two pulleys 40,41 and being fixedly connected to the lower slide member 19. As shown in a diagrammatic view in Fig.  
25 4, the fixed connection between the slide member 19 and the toothed belt 42 is provided by means of a fixing plate 43 screwed to the lower slide member, an edge 44 thereof pressing the belt 42 into fixed engagement with the edge 46 of a slit 45 in the lower slide member 19. The belts 39 forming part of the belt transmission for displacement of the upper slide member 18 are attached thereto in a corresponding  
30 manner. Finally, it should be noted that each of the belts 42 is passed freely mov-

able through a slit (not shown) in the upper slide member 18.

An inner mould half is arranged on the lower slide member for moulding the packaging or the inner outline of the cup-shaped waffle 1. With reference to Figs. 5, 6, and 7, the inner mould half 50 comprises a central bottom-forming part 51 having an upper end face 52 for the formation of the bottom 4 of the packaging and being fixedly arranged, i.e. not displaceable, in relation to the frame 10, said part 51 being arranged at the end of a guide rod 53 extending through an opening in the lower slide member 19 and attached to the bottom 13. The central bottom-forming part 51 is essentially conically shaped and is provided with a plurality of (in the present embodiment 24) grooves 54 extending radially inwardly from the outer conical face 55. At the outer end of the central bottom-forming part 51, a rod-like mould part 56 is pivotally arranged in each groove, the outer edge 57 thereof being intended to mould the inner face 6 of the outward corrugations 7 of the packaging. Each of the mould parts 56 are pivotally connected to a first end of a connecting rod 58. The other end of each of the connecting rods 58 is pivotally arranged on a displaceable mould part element 59 being fixedly connected to the lower slide member 19. The displaceable mould part element 59 is arranged on the guide rod 53 for controlled axial displacement along this and is provided with 24 radial grooves 60, in each of which one of the 24 connecting rods 58 is pivotally arranged. In a descending movement of the lower slide member 19 from the initial position shown in Fig. 3 or 5, the mould parts 56 are moved from a position, in which the outer edges 57 thereof are in a common plane with the upper end face 52 of the bottom-forming part 51, to a position, in which they extend downwards and outwards in a inclined manner from the pivot axis 61 with the central inner bottom-forming part 51, as shown on Fig. 6 and 7.

The outer mould half 70 comprises a central outer bottom-forming part 71 provided with an upper end face 72 for the formation of the outer surface of the bottom 4 of the packaging. The central outer bottom-forming part 71 is an essentially cylindrical body arranged at the end of a guide rod 74 extending through the upper slide member 18 and provided with a stop member 75 determining the position of the end

face 72 in the initial position of the outer mould half.

The central outer bottom-forming part 71 is provided with 24 radial slots 76 extending inwardly from the outer cylinder face 77. An outer rod-like mould part 78 is pivotally arranged in each of the slots 76, the outward edge 79 thereof being  
5 intended to form the outer face 8 of an inwardly facing corrugation on the packaging.

Each outer mould part 78 is pivotally connected to a first end of a connecting rod 80, the other end of which being pivotally connected to an upper fixed mould part 81 fixedly connected to the upper slide member 18. The upper fixed mould part 81  
10 is provided with 24 slots 83, wherein the pivotal connection to the corresponding 24 connecting rods 80 is provided. Finally, the guide rod 74 extends through the upper fixed mould part 81 to obtain a controlled axial movement in relation thereto.

From the initial position shown in Fig. 3 and 5, wherein the edges 79 of the outer rod-like mould parts 78 are in a common plane with the upper end face 72 of the  
15 central outer bottom-forming part 71, the outer mould half 70 may be move to a position, wherein the edges of the rod-like mould parts 78 extend outwards and downwards as shown in Fig. 6 and 7.

The apparatus according to the invention operates in the following manner:

In an initial position as shown in Fig. 3, a plane waffle 47 baked of a sugar-containing paste and still in a warm, workable state is placed on the lower inner mould  
20 half. In addition, a sheet of a flexible packing material (not shown) may be placed on top of the plane waffle 47, said material extending beyond the periphery of the plane waffle. In the initial position shown the edges 57 of the rod-like mould parts 56 and the end face 52 of the bottom-forming part 51 are in a common plane. The  
25 upper outer mould half 70 is also in an initial position, in which the edges 79 of the rod-like mould parts 78 and the end face 72 of the bottom-forming part 71 are in a common plane.

The upper slide member 18 is then moved downwards by activating the step motor 26, until the upper outer mould half 70 is in the position shown in Fig. 5, which is the starting position for the actual moulding of the packaging or waffle.

At the same time as the upper outer mould half continues its downward movement, 5 the lower slide member 19 is moved downwards by activating the step motor 27. During this downwards movement, the central bottom-forming part 51 of the inner lower mould half 50 remains fixed, i.e. it does not move, while the rod-like mould parts 56 are pivoted downwards about their pivot axis 61 in relation to the fixed central bottom-forming part 51 (confer Fig. 6).

10 The continuous downward movement of the upper slide member 18 causes the rodlike mould parts 78 of the outer mould half 70 to pivot downwardly about the pivot axis 82 in relation to the central outer bottom-forming part 71, the downward movement of the outer bottom-forming part 71 being prevented by the abutment to the fixed inner bottom-forming part with the plane waffle 47 as an intermediary 15 layer. During said simultaneous movement of the upper and lower slide members 18,19, the rod-like mould parts 78 of the outer mould half 70 arranged on the bisector of the interspaces between the rod-like mould parts 56 of the inner mould half 50 are gradually moved into said interspaces, the edges 79,58 of the rod-like mould parts 78,56 gradually providing a corrugation of the outer portion of the 20 plane waffle at the same time as said portion is folded up in relation to the original plane for formation of a packaging or waffle provided with a wall having the desired inclination and corrugation for instance provided by the end position shown in Fig. 7. It should, however, be noted that the movement can be stopped in any position between those shown in Fig. 5 and Fig. 7 for obtaining the desired shape of the 25 waffle.

Having obtained the desired shape of the waffle, the moulded waffle is cooled, until it is stable in shape. This cooling may be expedited by adding cooling air.

Subsequent to the above, the upper slide member is moved upwards to the position

shown in Fig. 3, whereafter the formed waffle is removed from the inner mould half, and the lower slide member is in conclusion moved upwards to the initial position shown in Fig. 3. A new plane waffle and a new sheet of packing material, if any, may then be placed on the inner mould half as described above.

5 During formation of the sidewalls and the corrugations therein, the two slide members 18, 19 are moved by activating the step motors relative to each other by means of a control unit (not shown) in such a manner that the rod-like mould parts 56,78 of the two mould halves 50,70 pivoted relative to each other so that the plane waffle is held tight continuously without essentially causing any strain thereof. In  
10 this respect, it is advantageous that pivot axis 61,82 between the rod-like mould parts 56,78 and the bottom-forming part 51, 71 is as close to the upper surface 52,72 of the bottom-forming part 51,71 as possible and that the two sets of the pivot axes 61,82 are only slightly interspaced, and preferably coincident.

The invention may amended in many ways without thereby deviating from the scope  
15 of the invention. It is thus of course possible to arrange the inner mould half as the upper mould half instead of the shown arrangement of the mould halves, if desired.

Moreover, at least one of the mould halves, in particular the lower one, or preferably both mould halves may be provided with a membrane (not shown), for instance of PTFE film placed on the forming edges of the rod-like mould parts in such a  
20 manner that it covers these and the interspaces therebetween, and if desired, also the surface of the bottom-forming part. This or these PTFE membrane(s) support(s) the plane waffle during moulding thereof, which may be advantageous at certain types of paste, and at the same time prevent(s) paste residues or crumbles from entering the rod mechanism of the lower mould half.



Claims

1. A packaging, in particular for icecream, comprising a cup-formed waffle (1) made from an essentially plane waffle (47) baked of a substantially sugar-containing paste by moulding said plane waffle in warm workable state, c h a r a c t e r i s e d in that the waffle (1) is formed in one piece of essentially the same thickness of material (b) and having a bottom (4) with an essentially convex bottom outline and a circumferential wall (5) folded up from the bottom without essentially causing any thereof strain, said wall having at least one corrugated wall portion provided with corrugations extending from the bottom outline, the corrugation height thereof increasing in outward direction from the bottom.
2. A packaging according to claim 1, c h a r a c t e r i s e d in that the pitch of the corrugation is no more than 20%, preferably no more than 10% and most preferably no more than 5% of the length of the outline in the corrugated portion.
3. A packaging according to claim 1 or 2, c h a r a c t e r i s e d in that the plane waffle is made from a paste having a sugar content in excess of 15 percentage by weight, preferably in excess of 25 percentage by weight and most preferably in excess of 35 percentage by weight.
4. A packaging according to one or more of the preceding claims, c h a r a c t e r i s e d in that it comprises a film wrapping arranged on the outer face of the waffle (1), said wrapping essentially circumscribing the waffle tightly and preferably extending beyond the upper edge (3) thereof.
5. A method of preparing a packaging comprising an integrally formed cup-shaped waffle (1) made of a plane waffle of paste by moulding this in a warm, workable state, said waffle (1) comprising a bottom (4) having an essentially convex bottom outline and a circumferential wall (5) folded up therefrom having at least one corrugated portion provided with corrugations extending from the bottom outline, c h a r a c t e r i s e d in that it comprises the following steps:

- a. placing the warm, workable plane waffle (47) between two mould halves (70, 50) arranged axially displaceable in relation to each other, an inner and an outer half, respectively, of which at least one and preferably both are provided with a bottom-forming central part (51,71) and both having a pivotal wall-forming, 5 circumferential parts (56,78) having at least one section containing corrugation-forming faces (57,79), and being pivotal between an initial position, wherein the wall-forming faces are in a common plane and a forming end position corresponding to the desired form and corrugation of the packaging;
- b. pressing the mould halves together about the plane waffle (47) and folding 10 the wall portion up and at the same time folding the section(s) thereof to be corrugated, while holding the plane waffle (47) tight and without essentially causing any strain of the wall portion, by means of a controlled simultaneous turning of the pivotal wall-forming parts (56,78) of the mould halves (50,70), in order to provide the desired waffle shape,
- 15 c. cooling the moulded waffle until the shape thereof is stable,
- d. displace the two mould halves (50,70) axially from each other,
- e. remove the complete waffle, and
- f. move the mould halves (50,70) back to their initial position and initial shape.
- 20 6. A method according to claim 5 for the preparation of a packaging, which in addition to the waffle (1) comprises a wrapping (2) arranged on the outer face thereof, c h a r a c t e r i s e d in that subsequent to step (a) a sheet of a flexible packing material is arranged adjacent the outer mould half (70) and between the two mould halves (50,70), whereafter the other steps are carried out for the plane waffle 25 (47) and the packing sheet jointly.

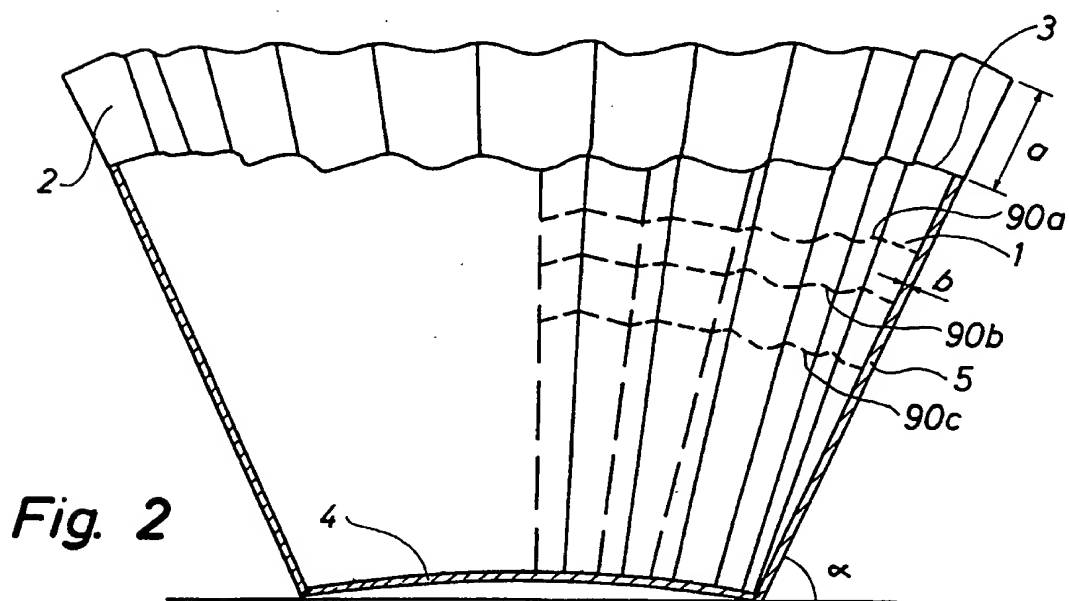
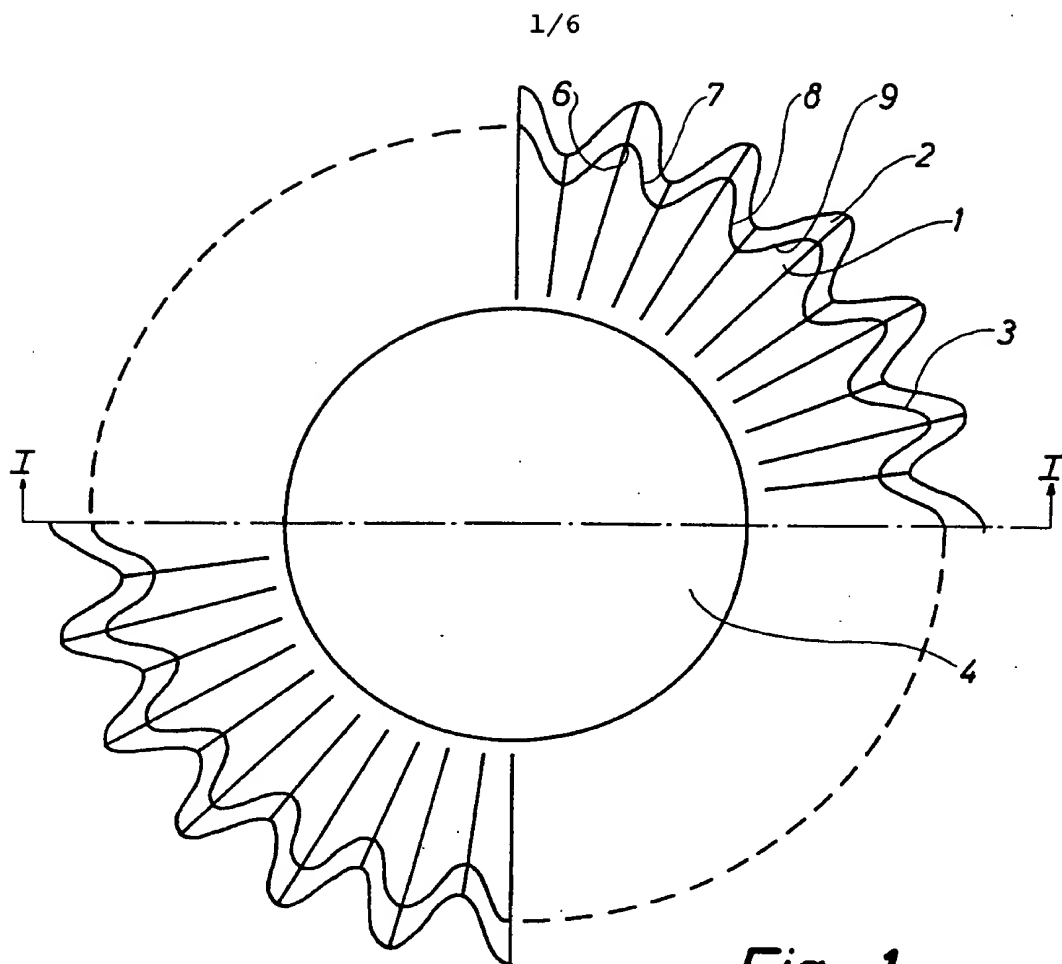
7. An apparatus for the manufacture of a packaging comprising a cup-shaped waffle made of a baked plane waffle (47) of paste by moulding this in a warm workable state into a continuously coherent cup with essentially uniform thickness of material (b), comprising an essentially plane bottom (4) with an essentially  
5 convex bottom outline and a circumferential wall (5) folded up therefrom having at least one corrugated wall section provided with corrugations extending from the bottom outline, c h a r a c t e r i s e d in that it comprises:

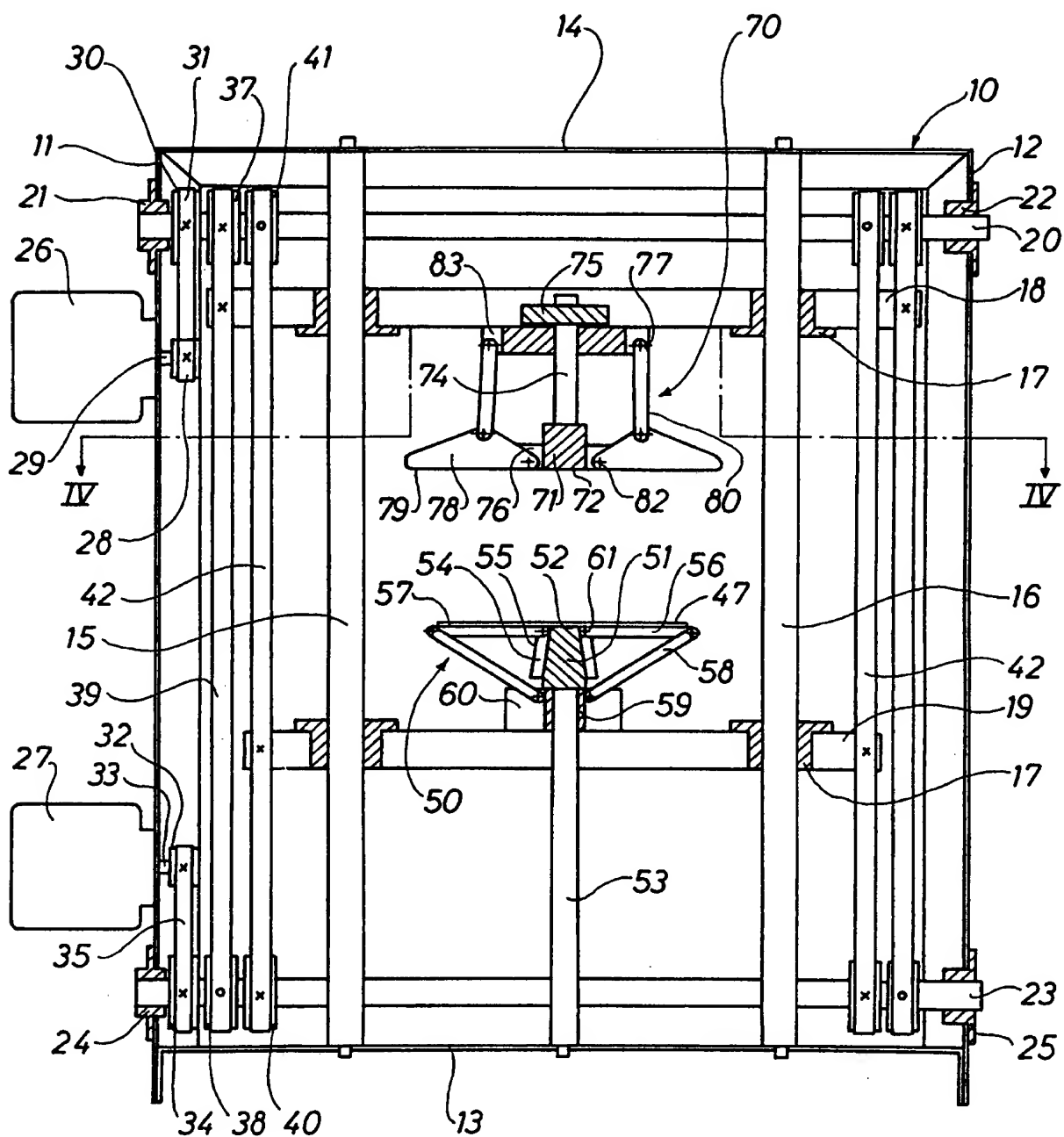
- two mould halves (50,70) axially displaceable to and fro each other in a frame, an inner and an outer mould half, respectively, of which at least one and  
10 preferably both are provided with a bottom-forming central part (51,71) and both have a wall-forming, circumferential part (56,78) being pivotally arranged in relation thereto and having at least one section containing corrugation-forming faces (57,79), and being arranged so as to pivot between an initial position, wherein the wall-forming faces (57,79) are in a common plane and an end-forming position,  
15 wherein they extend in an inclined outwardly manner in direction away from the bottom-forming part (51,71) to provide the wall and the intended corrugations therein,

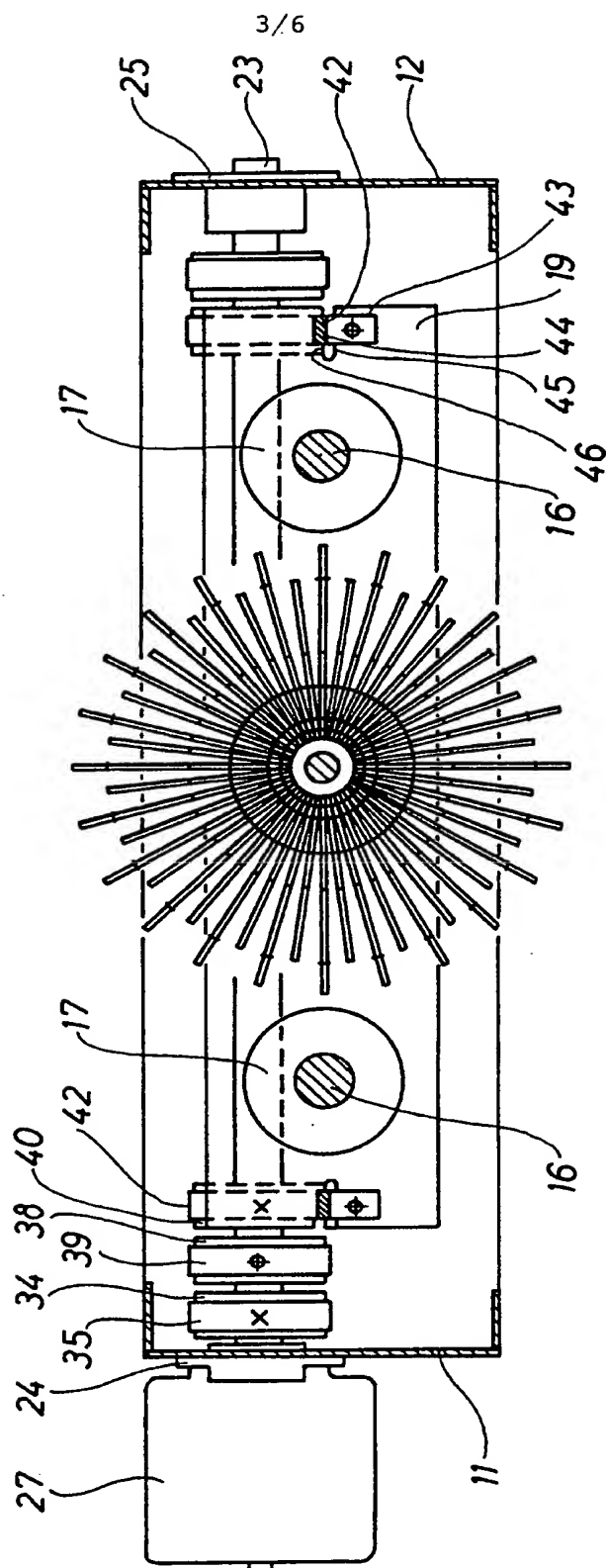
- means for a controlled simultaneous turning of the pivotal wall-forming part (56,78) of the mould halves (50,70) in relation to the at least one bottom-forming  
20 part (51,71) in such a manner that the wall of a workable plane waffle (47) placed between the mould halves is held tight during the folding thereof so as to not cause any strain thereof.

8. An apparatus according to claim 7, c h a r a c t e r i s e d in that the outer and inner corrugation-forming faces (79,57) are formed of a plurality of interspaced  
25 and rod-like mould parts (78,56) being pivotal in relation to their bottom-forming part (71,51), said rod-like mould parts extending radially or radiating outwardly in relation to their bottom-forming part (71,51), the rod-like mould part (78) of the outer wall-forming part being arranged in the interspace between the rod-like mould parts (56) of the inner wall-forming part and vice verse.

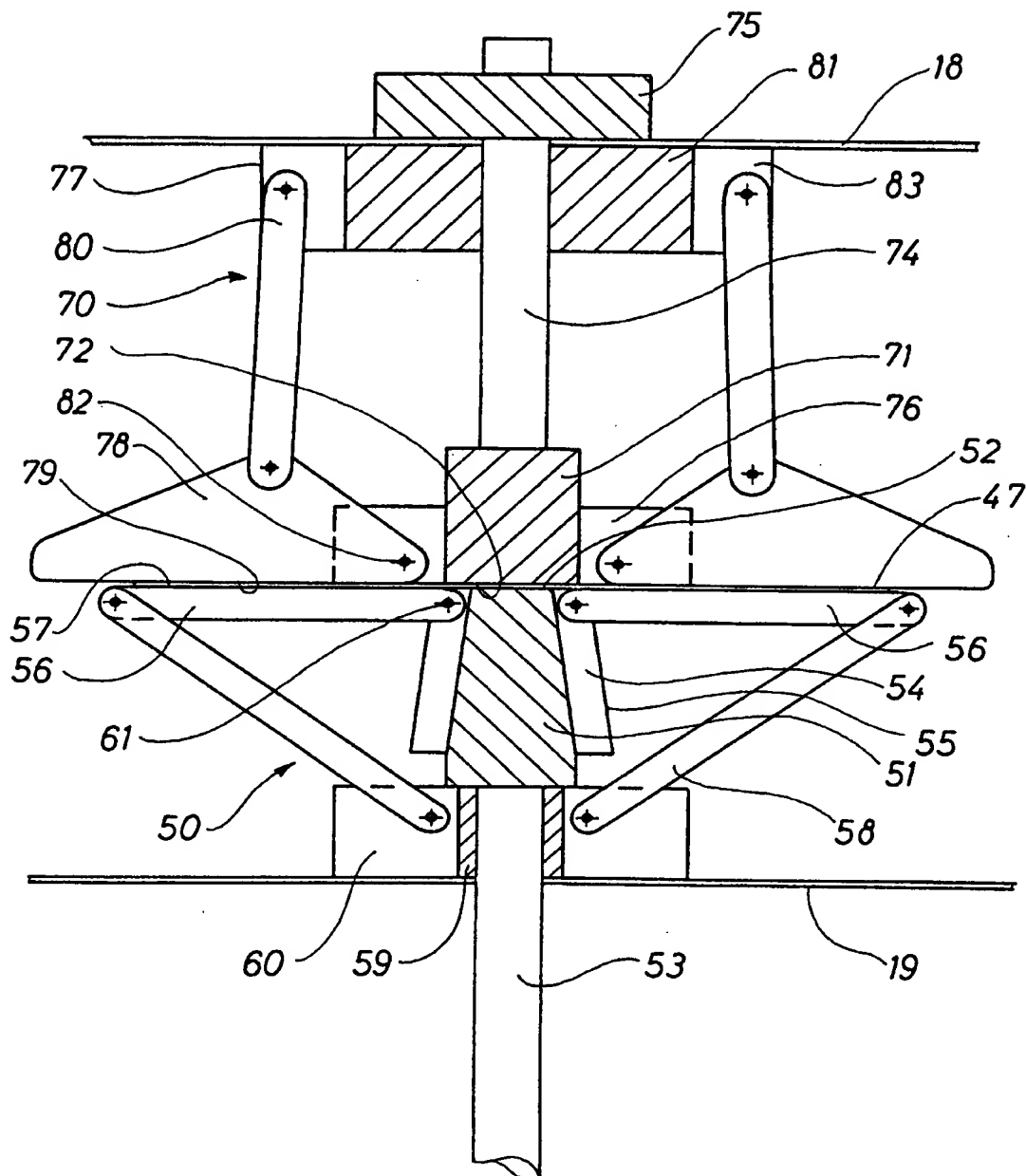
9. An apparatus according to claim 8, c h a r a c t e r i s e d in that the rod-like parts (56, 78) are connected to a common mould half elements (81,59) by means of connecting rods (58,80), said mould half element being axially displaceably arranged in relation to the bottom-forming part (51,71) of the mould half  
5 (50,70) in question.



*Fig. 3*

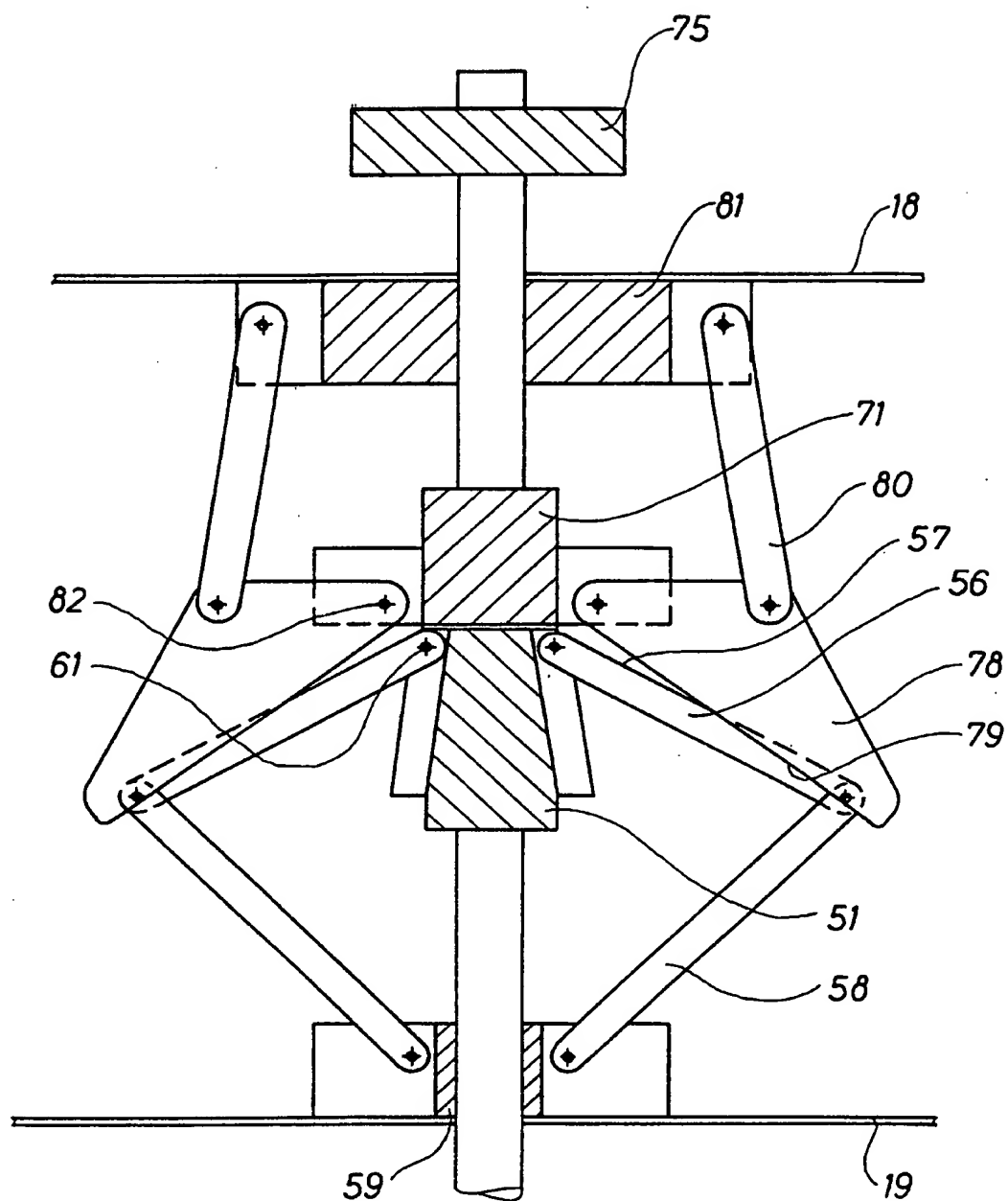


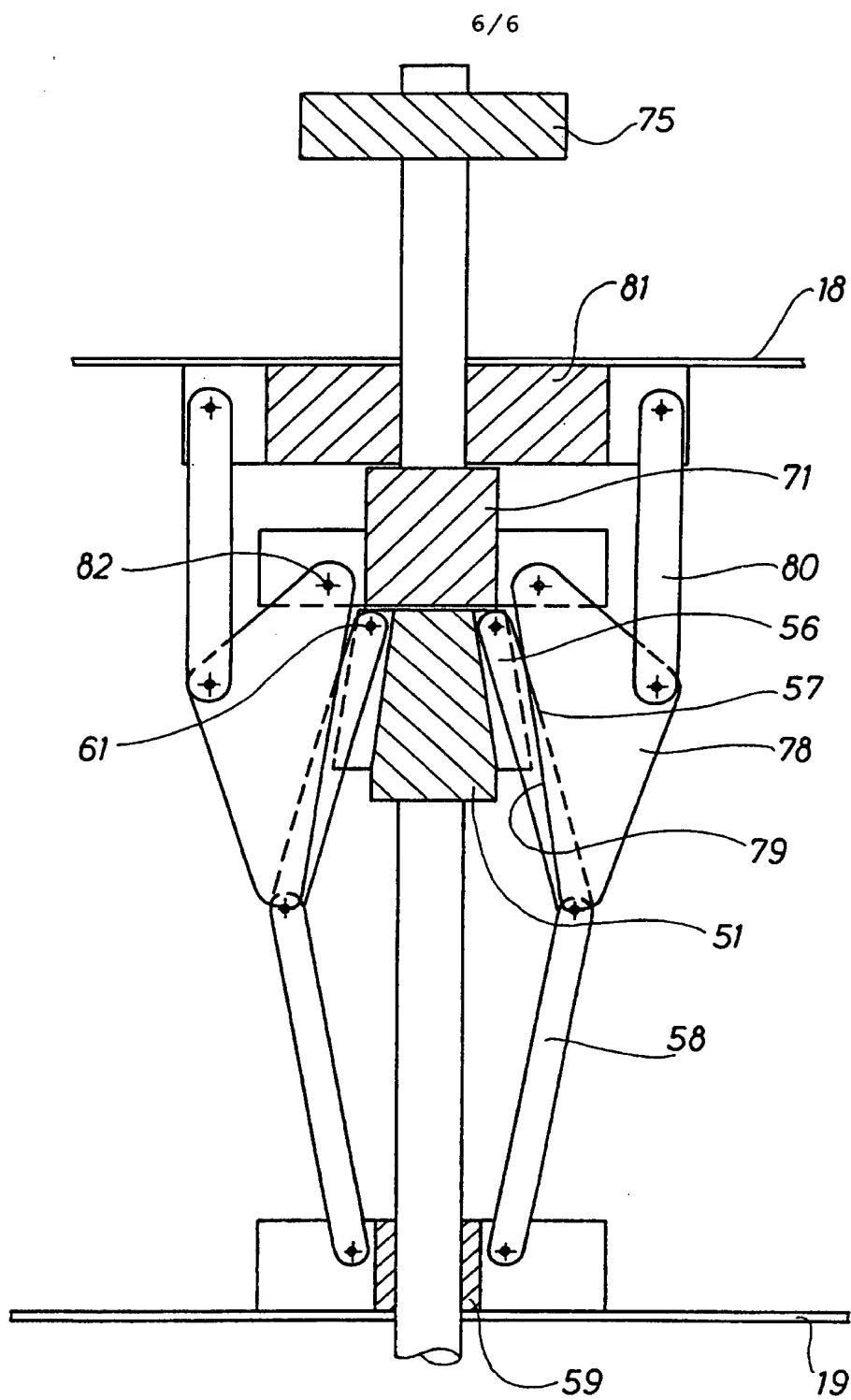
**Fig. 4**

*Fig. 5*



5/6

**Fig. 6**

**Fig. 7**

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 94/00352

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A21B 5/02, A21C 15/02, B65D 65/64, B65D 85/78  
According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A21B, A21C, B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR, A, 2577760 (SOCIETE DITE: LB S.A.), 29 August 1986 (29.08.86), page 2, line 20 - page 5, line 37, figures 1-5	1,5,7
Y	--	3
Y	DE, A, 2508533 (MADSEN, FRITZ VIGGO FRIBERG), 28 August 1975 (28.08.75), figures 1-3, claim 1	3
X	US, A, 2508724 (F.W. MOFFETT, JR), 23 May 1950 (23.05.50), column 2, line 4 - column 4, line 29, figures 1-7	1,2
	--	

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "B" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

16 December 1994

20 -12- 1994

Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer

Allan Westrin  
Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 94/00352

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 5002783 (M.R. RUIZ), 26 March 1991 (26.03.91), column 3, line 30 - line 44; column 4, line 32 - line 45, figures 3-4 --	1
A	EP, A, 0211356 (SEFOR S.R.L.), 25 February 1987 (25.02.87), abstract -- -----	1

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

26/11/94

International application No.  
PCT/DK 94/00352

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
FR-A-	2577760	29/08/86	NONE		
DE-A-	2508533	28/08/75	SE-A-	7502052	26/08/75
US-A-	2508724	23/05/50	NONE		
US-A-	5002783	26/03/91	US-A-	5128157	07/07/92
EP-A-	0211356	25/02/87	CH-A,B-	669222	28/02/89
			FR-A,B-	2582322	28/11/86